CLAIMS

What is claimed is:

1. A field effect transistor, comprising:

a substrate comprising a source region, a drain region, and a channel region therebetween;

an insulating layer disposed over said channel region, said insulating layer comprising a layer comprising aluminum nitride disposed over said channel region; and

a gate electrode disposed over said insulating layer.

2. The transistor of claim 1, wherein said insulating layer further comprises:

a layer of aluminum oxide disposed upon said channel region, said aluminum nitride disposed over said aluminum oxide.

3. The transistor of claim 1, wherein said insulating layer further comprises:

a layer of aluminum oxide disposed over said channel region, said aluminum nitride disposed under said aluminum oxide.

4. The transistor of claim 1, wherein said insulating layer further comprises:

a layer of silicon dioxide disposed upon said channel region, said aluminum nitride disposed over said silicon dioxide.

5. The transistor of claim 1, wherein said insulating layer further comprises:

a layer of silicon dioxide disposed over said channel region, said aluminum nitride disposed under said silicon dioxide.

6. The transistor of claim 1, wherein said insulating layer further comprises:

a layer of silicon nitride disposed upon said channel region, said aluminum nitride disposed over said silicon nitride.

7. The transistor of claim 1, wherein said insulating layer further comprises:

a layer of silicon nitride disposed over said channel region, said aluminum nitride disposed under said silicon nitride.

8. The transistor of claim 2, wherein said insulating layer further comprises:

a layer of silicon dioxide disposed upon said aluminum nitride.

9. The transistor of claim 2, wherein said insulating layer further comprises a layer of silicon dioxide disposed under said aluminum oxide.

10. The transistor of claim 4, wherein said insulating layer further comprises:

a layer of silicon dioxide disposed over said aluminum nitride.

11. The transistor of claim 1, wherein said insulating layer further comprises:

a layer of aluminum oxide disposed over said aluminum oxide.

12. The transistor of claim 11, wherein said insulating layer further comprises:

a layer of silicon dioxide disposed over said aluminum oxide.

13. The transistor of claim 12, wherein said insulating layer further comprises:

a layer silicon disposed over said silicon dioxide.

14. A field effect transistor, comprising:

a substrate comprising a source region, a drain region, and a channel region therebetween;

an insulating layer disposed over said channel region, said insulating layer comprising a first layer comprising aluminum oxide disposed upon said channel region and a second layer comprising aluminum nitride disposed upon said first layer; and

a gate electrode disposed over said insulating layer.

15. A semiconductor device, comprising:

a substrate comprising a source region, a drain region, and a channel region therebetween;

an insulating layer disposed over said channel region, said insulating layer comprising a layer comprising aluminum nitride disposed over said channel region; and

a gate electrode disposed over said insulating layer.

16. The semiconductor device of claim 15, wherein said device comprises a field effect

transistor.

17. A multi-terminal device, comprising:

a substrate comprising a source region, a drain region, and a channel region therebetween;

an insulating layer disposed over said channel region, said insulating layer comprising a layer comprising aluminum nitride disposed over said channel region; and

a gate electrode disposed over said insulating layer.

18. The multi-terminal device of claim 17, wherein said device comprises a field effect transistor.

19. A method of forming a field effect transistor, comprising:

forming a substrate comprising a source region, a drain region, and a channel region therebetween;

disposing an insulating layer over said channel region, said insulating layer comprising a layer comprising aluminum nitride disposed over said channel region; and

disposing a gate electrode over said insulating layer.

20. The method of claim 19, wherein said insulating layer further comprises:

a layer of aluminum oxide disposed upon said channel region, said aluminum nitride disposed over said aluminum oxide.

21. The transistor of claim 19, wherein said insulating layer further comprises:

a layer of aluminum oxide disposed over said channel region, said aluminum nitride disposed under said aluminum oxide.

22. The method of claim 19, wherein said insulating layer further comprises:

a layer of silicon dioxide disposed upon said channel region, said aluminum nitride disposed over said silicon dioxide.

23. The transistor of claim 19, wherein said insulating layer further comprises:

a layer of silicon dioxide disposed over said channel region, said aluminum nitride disposed under said silicon dioxide.

24. The method of claim 19, wherein said insulating layer further comprises:

a layer of silicon nitride disposed upon said channel region, said aluminum nitride disposed over said silicon nitride.

25. The transistor of claim 19, wherein said insulating layer further comprises:

a layer of silicon nitride disposed over said channel region, said aluminum nitride disposed under said silicon nitride.

26. A method of forming a semiconductor device, comprising:

forming a substrate comprising a source region, a drain region, and a channel region therebetween;

disposing an insulating layer over said channel region, said insulating layer comprising a layer comprising aluminum nitride disposed over said channel region; and

disposing a gate electrode over said insulating layer.

27. The transistor of claim 1, wherein said insulating layer further comprises at least one of silicon dioxide, aluminum oxide, and silicon nitride.